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Forest Health Protection

Pacific Southwest Region
Northeastern California Shared Service Area

Date: August 30, 2013
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To: District Ranger, Beckwourth Ranger District, Plumas National Forest

Subject: Evaluation of the Happy Aspen Restoration Project (FHP Report NE13-08)

At the request of Rachel Condon, Timber Sale Administrator, Beckwourth Ranger District, Danny Cluck, Forest Health Protection (FHP) Entomologist, visited the Happy Aspen project on August 30, 2013. The objective of this visit was to evaluate the current health of the existing aspen stand and determine the impacts of various levels of conifer removal on promoting and maintaining the aspen ecosystem. Insect and disease activity was noted and treatment options were discussed, including the effects of retaining large diameter (>30" dbh) conifers. Recommendations provided in this report are aimed at helping the District decide what level of conifer removal will be effective in maintaining and improving aspen communities. Rachel Condon accompanied me to the field.

Description of the project area

The Happy Aspen Restoration Project is located approximately 5 miles east of the community of Cromberg, CA in Happy Valley (T23N, R12E, Section 3). The elevation of the site is 5800 feet with annual precipitation ranging from 30 – 40 inches. Tree species composition includes Quaking aspen (*Populus tremuloides*), ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*Pinus contorta var. murrayana*) and white fir (*Abies concolor*). Conifer encroachment into historically aspen dominated stands has reduced aspen overstory cover and regeneration. The management objectives for this project are to maintain and enhance the existing aspen cover by increasing light and provide additional growing space for regeneration to begin to reoccupy the local historic distribution. There is also a desire to retain a number of large diameter conifers in order to provide habitat for northern goshawk and California spotted owl.

General observations

- Quaking aspen is growing throughout most of project area at various densities. However, aspen in most areas are in a state of decline with decadent overstory trees and a general

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lack of seedlings and saplings.

- Aspen regeneration is low where conifer canopy cover is taking over the stand and aspen has been excluded in some areas now dominated by conifer species.
- Many overstory aspen stems are experiencing crown die back and are also infected with white trunk rot (*Phellinus tremulae*). Many are overtopped by conifers.
- Marssonina leaf spot (*Marssonina populi*) is causing early defoliation of many aspen stems.
- Aspen has been completely replaced by conifers in some locations with only dead and downed aspen stems remaining on site. Many of these old stems have evidence of previous sooty-bark canker (*Encoelia pruinosa*) infections and successful attacks from bronze poplar borer (*Agrilus liragus*).
- Most conifers are relatively young (< 100 - 150 years old) and have likely established since the last wildfire.
- Increment cores show that most of the large conifers (>30" dbh) are also < 150 years old. Only four or five "old-growth" conifers were observed within the project area as evidenced by size, bark and crown characteristics.

Aspen Risk Ratings

Several risk rating criteria have been established for aspen throughout the west. Most of these criteria relate to the abundance of regenerating aspen within a stand, the amount of aspen browsing by wild and domestic ungulates, the condition of the overstory aspen stems and the level of conifer encroachment. Browsing of young aspen combined with conifer encroachment can put an aspen stand at a very high risk of being removed from the landscape. Conifer encroachment and densification often results from the lack of fire disturbance and can eventually shade out aspen stems. Once conifer canopy cover reaches a critical threshold, older aspen stems begin to decline and regeneration is suppressed.

Conifer cover thresholds that result in elevated risk to aspen stand health vary slightly among regional risk rating systems. However, most risk rating systems describe negative impacts to aspen health beginning when conifer cover reaches 25%. This cover level is not part of a continuum of negative affects but rather a critical threshold where at higher levels aspen abundance declines dramatically. Regional Forest Health Protection aspen surveys categorized percent conifer cover as "severe" when it exceeded 25% (Cluck 2012). 50% conifer canopy cover has been described as the highest risk in some rating systems (Bartos and Campbell 1998). Although these thresholds were established to describe high risk situations, any conifer competition will reduce aspen live crown ratio and basal area increment (Berrill and Dagley 2012).

A conifer canopy threshold of 20% has also been observed above which understory vegetation is highly suppressed (Bobette Jones, Unpublished data, Lassen National Forest). Below this threshold there is an exponential increase in the richness and abundance of understory plant cover. The increase in sunlight and the warming of soils are cited as contributing factors. This 20% threshold is likely relevant to the health and abundance of aspen regeneration.

To maintain and enhance aspen over the long-term, some restoration projects have set post-treatment objectives of 0 - 5% conifer canopy cover or other low levels so as not to exceed 25% within the first 15 years post-treatment (USFS and BLM, CA and NV).

Conifer seed production and regeneration in aspen stands

Conifers within and adjacent to aspen stands provide a seed source that, in the absence of fire, can lead to greater conifer abundance at the expense of aspen. Mature white fir produce abundant amounts of seed and can readily establish within a shaded aspen stand (Pierce and Taylor 2010). Lodgepole pine also produces abundant seed and is moderately shade tolerant. Lodgepole pine regeneration can be especially abundant where ground disturbance from harvest activity has provided bare soil for seed to germinate. Ponderosa and Jeffrey pine are not easily established in shaded areas and generally require disturbance that creates canopy openings and bare mineral soil for seed germination (Forest Effects Information System [FEIS] database).

Treatment alternatives

It is important to consider that aspen communities only make up about 1% of the landscape in northern California. As such, management decisions should emphasize maximizing the benefits for aspen while other objectives, such as the growth and retention of large conifers for wildlife habitat, should be focused in other areas as much as possible.

Potential alternatives:

1) *Do nothing* – In the absence of any disturbance, conifers will continue to suppress aspen regeneration and overstory aspen will continue to decline and disappear within many areas of the stand. Aspen located at the edges of meadow openings and within riparian corridors will likely persist at a low level, occupying a fraction of its local historic distribution.

2) *Remove all conifers that are competing with existing aspen or are located in areas where aspen was historically present* – Removing all competing conifers from within the aspen stand and buffer areas would maximize the amount of sunlight reaching the forest floor. This will raise soil temperatures and increase photosynthesis allowing aspen suckers to thrive. Buffer areas should be wider at the south end of the stand to further increase the amount of sunlight reaching the forest floor. This type of treatment has proven successful in increasing aspen regeneration in as little as three years post-treatment (Jones et al 2005). The removal of all conifers should reduce the rate of conifer reinvasion and the subsequent need for follow-up treatments to remove conifer regeneration. This alternative would not provide large trees for northern goshawk and California spotted owl habitat.

3) *Remove all competing conifers <30" dbh* – The removal of all competing conifers <30" dbh would likely achieve the same results as alternative #2 in some parts of the stand due to the absence of any >30" dbh trees. However, where concentrations of these larger trees exist, there would be a loss in the effectiveness and longevity of the treatment due to increased conifer canopy cover. Some areas within the Happy Aspen project appear to have enough >30" dbh conifers to easily exceed the 25% canopy cover threshold and one location appeared to easily exceed 50% canopy cover. These are the areas where aspen are most at risk and should be a priority for treatment. If retained, these trees would continue to suppress aspen regeneration and contribute to the decline of the existing overstory aspens stems. Canopy cover readings taken along transects within project boundary or estimating

the percent cover contributed by the known number of existing large conifers would help quantify the effects of this alternative to aspen regeneration. This alternative would provide the maximum number of trees for northern goshawk and California spotted owl habitat.

4) *Remove all competing conifers except for >30" dbh trees exhibiting old-growth characteristics* – Due to the scarcity of these types of trees within the project area, this treatment would be very similar to alternative #2. Very little area would be impacted by the retention of the 4 to 5 existing old-growth trees and the negative impacts to aspen would be minimal. However, this alternative may not provide enough large diameter trees to meet objectives for northern goshawk and California spotted owl habitat.

5) *Remove all competing conifers except for select >30" trees* – This alternative is a compromise between the objectives of complete aspen restoration and retention of large tree habitat that may achieve satisfactory results for both. All old-growth conifers plus a few additional large diameter conifers would be retained. To minimize the amount of aspen area impacted, large diameter leave trees should be restricted to one or two small clumps or to a few very widely spaced single trees so as not to exceed 5% cover in the stand. Potential leave trees should have minimal direct competition with aspen and/or be concentrated at the north end of the stand to minimize shading effects. Jeffrey and ponderosa pine should be retained over both white fir and lodgepole pine to minimize the rate of conifer reinvasion and in the case of white fir, because they have less leaf area and cast less shade (Gersonde and O'Hara 2005). Determining canopy cover as previously described can help choose the number and location of leave trees.

Considerations for insects and diseases of aspen

Despite the presence of a few common insect and disease agents, they are impacting aspen health far less than the existing conifer encroachment. While it is important for the District to be aware of the potential for damage by these agents, the impacts of conifer encroachment are a more imminent concern. Once aspen stands are treated by removing conifers and protecting regeneration (if necessary), vigorous stands will be more resilient to the impacts of any native insect or disease.

If you have any questions regarding this report and/or need additional information please contact Danny Cluck at 530-252-6431.

/s/ Danny Cluck

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